

PATENT COOPERATION TREATY

Eingegangen

- 5. Feb. 2004

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Keller & Partner AG

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PCT

WRITTEN OPINION (PCT Rule 66)

Date of mailing
(day/month/year) 03.02.2004

Applicant's or agent's file reference
RS/pe-16072

REPLY DUE **within 3 month(s)**
from the above date of mailing

International application No.
PCT/CH 03/00243

International filing date (day/month/year)
11.04.2003

Priority date (day/month/year)
12.04.2002

International Patent Classification (IPC) or both national classification and IPC
H02M3/337

Applicant
ASCOM ENERGY SYSTEMS AG

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:

FRIST NOTIERT
03.05.04 mh

 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application
3. The applicant is hereby **invited to reply** to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 12.08.2004

Name and mailing address of the international preliminary examining authority:



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I. Basis of the opinion

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed"*):

Description, Pages

1-10 as originally filed

Claims, Numbers

1-41 as originally filed

Drawings, Sheets

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This opinion has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

6. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	1,2,5,7,10, 11,12,26, 27,28,32
Inventive step (IS)	Claims	1-41
Industrial applicability (IA)	Claims	

2. Citations and explanations**see separate sheet**

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: DE DONCKER R W ET AL: 'A three-phase soft-switched high power density DC/DC converter for high power applications' 1988 IEEE , 2 October 1988 (1988-10-02), pages 796-805, XP010519176
D2: EP-A-0 430 242 (SYSTEL DEV & IND LTD) 5 June 1991 (1991-06-05)

The present international application does not fulfil the requirements of Article 33(2) PCT because subject-matter of claims 1, 5, 26, 32 is not new.

Lack of novelty

Relating claims 1, 4

1. Document D1 discloses a power conversion circuit (Fig. 1) having a power transformer (Lm), four semiconductor switching elements (S1-S4) connected as a bridge across an input to the power conversion circuit and connected to a primary winding (in which I_{prim} flows) of the power transformer to reverse current through the primary winding,
- a split secondary winding on the power transformer,
 - a first unidirectional current conducting device (first diode connecting the secondary winding to the output Co, Ro via inductor Lo) connected from a one end (+) of the split secondary winding to an inductor (Lo,
 - a second unidirectional current conducting device (second diode connecting the secondary winding to the output Co, Ro via inductor Lo) connected from a second end of the split secondary winding to the inductor,
 - the inductor and a connection to an interconnection between two halves of the split secondary winding being connected to the output power conversion circuit (Co, Lo,
 - an injection voltage source (L_1) connected to the primary winding of the power transformer for applying an injection voltage to the primary winding in addition to an input voltage to the primary winding via the semiconductor switching elements.

Therefore subject-matter of claim 1 is not new (Article 33(2) PCT).

1.2 Document D1 discloses also that the unidirectional current conducting devices are semiconductor switching devices.

Therefore also subject-matter of claim 4 is not new (Article 33(2) PCT).

Relating claim 5

2. Document D2 (fig. 12) discloses:

a power conversion circuit having:

- a power transformer (with one primary winding and two secondary windings) with at least primary winding and at least one secondary winding, a primary circuit (switch and primary winding of the transformer T1) connected with the primary winding and adapted to deliver a main primary current alternating in direction through the primary winding and adapted to deliver a main power secondary current from the secondary winding and to deliver electric power to a load,

- at least one semiconductor unidirectional current conducting device (D1a, D1b) in at least one of the primary and the secondary circuits and adapted alternately to conduct a main current passing through an associated one of the windings of the power transformer; comprising:

- an injection voltage source (T1) connected to apply a supplemental reverse bias voltage to the semiconductor unidirectional current conducting device sufficient to terminate forward conduction (induced by the current I_{R2}) (see column 3, line 31-58) in the device and to deplete carriers in the device at times prior to each reverse biasing of the device by an alternating of the main primary current causing a reversal of voltage across the associated power transformer winding.

Therefore also subject-matter of claim 5 is not new (Article 33(2) PCT).

Relating claims 26 and 32

3. Document D2 (fig. 12) discloses:

a power conversion circuit:

- having a power transformer (with one primary winding and two secondary windings) with a primary winding and at least one secondary winding having a semiconductor rectifying means (D1a, D1b) coupled in current conducting relation with at least one secondary winding, an inductor (L1a, L1b) coupled in current conducting relation between the semiconductor rectifying means and an output connection;
- means for applying (T1)a first, relatively low reverse bias voltage to the semiconductor rectifying means to halt forward conduction (induced by the current I_{R2}) (see column 3, line 31-58) and deplete carriers in the semiconductor rectifying means prior to each application to the semiconductor rectifying means of a reverse bias larger than the first relatively low bias voltage.

Therefore also subject-matter of claim 26 is not new (Article 33(2) PCT).

The same reasoning applies mutatis mutandis to relative method claim 32 and therefore its subject-matter is not new (Article 33(2) PCT).

At the present stage it seems that remaining dependent claims also don't add any new or inventive special technical features, so that such claims don't comply with Article 33(2) and/or 33(3) PCT.

Clarity objections

4.1 The attention of the applicant is drawn to the fact that although claims 1, 5, 26 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought. The aforementioned claims therefore lack conciseness. Moreover, lack of clarity of the claims as a whole arises, since the plurality of independent claims makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

Hence, claims 1, 5, 26 do not meet the requirements of Article 6 PCT.

In order to overcome this objection, it would appear appropriate to file an amended set of claims defining the relevant subject-matter in terms of a single independent claim in each category followed by dependent claims covering features which are merely optional (Rule

6.4 PCT).

4.2 Moreover the attention of the applicant is drawn to the fact that claim 26 is unclear and not supported by the description since the "means for applying a first ...voltage" are defined in the single embodiment of the description as "injection voltage source" and the technical effect achieved by such feature is the same claimed in claim 5.

A generalisation of such means as formulated in claim 26 seems therefore not allowable.

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